UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,626	11/23/2005	Georg Bogner	5367-163PUS	2021

27799 7590 03/28/2007

COHEN, PONTANI, LIEBERMAN & PAVANE
551 FIFTH AVENUE
SUITE 1210
NEW YORK, NY 10176

EXAMINER	
ARORA, AJAY	
ART UNIT	**PAPER NUMBER**
2811	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/529,626	BOGNER ET AL.	
	Examiner	Art Unit	
	Ajay K. Arora	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/16/07*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12 and 15-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10, 12,and 15-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/16/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7, 9, 10, 12 and 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrah (6,498,355), hereinafter Harrah, in view of Komoto (US 6,340,824), hereinafter Komoto, and further in view of Salam (US 6,095,666), hereinafter Salam.

Regarding claim 1, Harrah (refer to Figure 2-4) teaches an optoelectronic component comprising:

a heat sink (6);

a carrier (30) thermally conductively connected (using 24) to the heat sink (6);

a semiconductor arrangement (28) which emits or receives electromagnetic radiation and which is arranged on the carrier (30);

external electrical connections (42/44) which are connected to the semiconductor arrangement (28), wherein the external electrical connections (42/44) are arranged in

electrically insulated fashion (by dielectric layers 10 and 48) on the heat sink (6) at a distance from the carrier (30);

a basic housing (26) arranged on the heat sink (6).

However, Harrah does not teach that the basic housing comprises a "cavity" and that the semiconductor arrangement and the carrier are arranged in "a cavity defined in the basic housing" and that the said cavity "comprises an inner side which obliquely faces the semiconductor arrangement and forms a first reflective area" for a portion of the electromagnetic radiation. Komoto (refer to Figure 10C) teaches a cavity-type optoelectronic component, wherein a semiconductor arrangement (10 or 50) is arranged in a cavity defined in the basic housing (Col. 19, lines 35-39) and that the cavity comprises an inner side which obliquely faces (see Figure 10C) the semiconductor arrangement (10 or 50) and forms a first reflective area (Col. 19, lines 41-44) for a portion of the electromagnetic radiation It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Harrah so that the semiconductor arrangement and the carrier are arranged in a cavity defined in the basic housing and that the said cavity comprises an inner side which obliquely faces the semiconductor arrangement and forms a first reflective area for a portion of the electromagnetic radiation. The ordinary artisan would have been motivated to modify Harrah for at least the purpose of providing a cavity instead of an area filled completely with resin to limit the attenuation of the LED light say by impurities in the resin, and to

control light intensity in a specific direction by controlling angle of an angular/oblique reflective area.

Further, Harrah does not teach "a reflective filling compound provided between the semiconductor arrangement and the inner side of the basic housing, the reflective filling material comprising a curved surface forming a second reflective area for another portion of the electromagnetic radiation". Salam (refer to Figure 10) teaches an LED package, which has a curved surface (58) which forms a reflective area for a portion of the electromagnetic radiation, but does not teach that the reflective area is formed by a "filling compound provided between semiconductor arrangement and the inner side of the basic housing". Komoto (refer to Figure 46) teaches forming curved surfaces (surface of 542E) utilizing filling compounds, wherein filling compound is provided between semiconductor arrangement (990) and the inner side of the basic housing (520). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Harrah so that a reflective filling compound is provided between the semiconductor arrangement and the inner side of the basic housing, the reflective filling material comprising a curved surface forming a second reflective area for another portion of the electromagnetic radiation. The ordinary artisan would have been motivated to modify Harrah for at least the purpose of providing control of light intensity in a specific direction (depending on the curvature of the reflective area) using a filling compound that can easily be shaped to various curvatures.

Regarding claim 2, Harrah (refer to Figure 2-4) teaches that the carrier (30) contains a carrier substrate and an electrically insulating layer (Col. 4, lines 51-54) arranged thereon.

Regarding claim 3, Harrah (refer to Figure 3) teaches the semiconductor arrangement (28) and the electrically insulating layer (Col. 4, lines 51-54) have an electrically conductive layer (layer to which wire bonds 48 or 50 are attached closest to semiconductor arrangement 28) arranged therebetween which is connected to one of the external electrical connections.

Regarding claim 4, Harrah (refer to Figures 2-4) teaches that the semiconductor arrangement (28) contains a semiconductor chip (Col. 2, lines 57-60).

Regarding claim 5, Harrah (refer to Figure 4) teaches that the external electrical connections (42/44) include conductor tracks (8) on a printed circuit board (52).

Regarding claim 6, Harrah (refer to Figure 4) teaches that conductor tracks (8) on different printed circuit boards (Col. 6, lines 33-37) arranged above one another form the electrical connection and are connected to one another by plated-through holes (that form vias 12) defined in the printed circuit boards.

Regarding claim 7, Harrah (refer to Figures 2-4) teaches the carrier (30) substrate has at least one material with good thermal conductivity from the group comprising Si (Col. 4, lines 51-54), diamond-coated Si, diamond, SiC, AlN and BN.

Regarding claim 9, Harrah (refer to Figures 2-4) teaches that the semiconductor arrangement (28) is attached to the carrier (30) by a metal solder (32).

Regarding claim 10, Harrah (refer to Figures 2-4) teaches that the carrier (30) is attached to the heat sink (6) by a metal solder or a thermally conductive (Col. 5, lines 1-7) adhesive (24).

Regarding claim 12, Harrah (refer to Figures 2-4) as modified above teaches that the cavity of the basic housing (26) contains only one semiconductor arrangement (28).

Regarding claim 15, Harrah teaches substantially the claimed structure but does not teach that the filling compound contains TiO_2 or an epoxy resin filled with TiO_2 particles. Komoto (refer to Figure 106) teaches an optoelectronic component, wherein the filling compound (2140a) contains TiO_2 or an epoxy resin filled with TiO_2 particles (Col. 48, lines 66-67). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Harrah so that the filling compound contains TiO_2 or an epoxy resin filled with TiO_2 particles. The ordinary artisan would have been

motivated to modify Harrah for at least the purpose of providing wavelength selectivity (see Komoto, Col. 48, lines 24-34).

Regarding claim 16, Harrah (refer to Figures 2-4) teaches that the semiconductor arrangement (28) is at least partly encapsulated by a radiation-pervious encapsulation compound (26).

Regarding claim 17, Harrah (refer to Figures 2-4) teaches at least some of the external connections (42/44) are arranged between the basic housing (26) and the heat sink (6).

Regarding claims 18, 19 and 20, Harrah teaches substantially the claimed structure but does not specifically teach an electrical power consumption of the optoelectronic component id: at least 0.5 W (per claim 18), at least 1 W (per claim 19), or at least 3 W (per claim 20). It would have been an obvious matter of optimization of a recognized results driven variable by one of ordinary skills in the art at the time of the invention, to modify Harrah such that it is provided for an electrical power of at least 0.5 W, or 1 W, or 3 W respectively. Optimization of such results driven variable, for example increasing the size of heat sink, are routine in the art. The ordinary artisan would have been motivated to modify Harrah for at least the purpose of providing a high light intensity while utilizing the heatsink for effective removal of dissipated heat.

Regarding claim 21, Harrah teaches substantially the claimed structure but does not specifically teach that the optoelectronic component has a base area of no more than 1 cm^2. It would have been an obvious matter of optimization of a recognized results driven variable by one of ordinary skills in the art at the time of the invention to modify Harrah such that the optoelectronic component has a base area of no more than 1 cm^2. The ordinary artisan would have been motivated to modify Harrah for at least the purpose of providing a high power output component with a relatively small footprint.

Regarding claim 22, Harrah teaches a component-based module, wherein the module has a plurality of optoelectronic components as claimed in claim 1 (Col. 4, lines 36-38).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrah in view of Komoto, further in view of Salam, and still further in view of Jackson (US 6,800,930), hereinafter Jackson.

Regarding claim 8, Harrah (refer to Figures 2-4) teaches substantially the claimed structure including the electrically insulating layer but does not teach that the electrically insulating layer comprises SiO_2. Jackson teaches the use of electrically insulating layer comprising SiO_2 (Col. 6, lines 55-58). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Harrah so that the electrically insulating layer comprises SiO_2. The ordinary artisan would have been motivated to modify Harrah for at least the purpose of utilizing a dielectric that has excellent adhesion to chips and substrates that often comprise silicon.

Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrah in view of Komoto, further in view of Salam, and still further in view of Stopa (US 6,318,886), hereinafter Stopa.

Regarding claim 23, Harrah teaches substantially the claimed structure including component-based module having a plurality (Col. 4, lines 36-39) of optoelectronic components as claimed in claim 1, but does not specifically disclose that "at least some of the optoelectronic components are electrically conductively connected to one another by conductor tracks". Stopa teaches a module with plurality of optoelectronic components wherein at least some of the optoelectronic components are electrically conductively connected to one another by conductor tracks (Col. 5, lines 52-56). It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Harrah so that at least some of the optoelectronic components are electrically conductively connected to one another by conductor tracks. The ordinary artisan would have been motivated to modify Harrah for at least the purpose of controlling at least some of the optoelectronic components together.

Regarding claim 24, Harrah teaches substantially the claimed structure including that the optoelectronic components are arranged in the form of a matrix (Col. 4, lines 36-39) but does not disclose that "at least some of the optoelectronic components are connected in series". Stopa teaches a module with plurality of optoelectronic

components wherein at least some of the optoelectronic components are connected in series. It would have been obvious to one of ordinary skills in the art at the time of the invention to modify the invention of Harrah so that at least some of the optoelectronic components are connected in series. The ordinary artisan would have been motivated to modify Harrah for at least the purpose of supplying the same current to the optoelectronic components (since they are connected in series) to easily control one of the variables in the optoelectronic component light output.

Response to Arguments

Applicant's arguments filed 1/16/2007 have been fully considered but they are not persuasive.

On pages 12-13, applicant argues that Salam does not teach or suggest the limitation of "a reflective filling compound provided between the semiconductor arrangement and the inner side of the basic housing, the reflective filling material comprising a curved surface forming a second reflective area for another portion of the electromagnetic radiation". Applicant further argues (on page 13) that neither Komoto's "dipping resin" nor Komoto's "molded resin" is used to reflect electromagnetic radiation. This argument is not persuasive and it appears that the rejection has been misunderstood. Referring to the rejection of claim 14 in the previous office action, Salam was not relied upon to teach the filling material but instead, Salam was relied upon to teach "a curved surface

(58) which forms a reflective area for a portion of the radiation". The rejection acknowledged that Salam did not teach a that the reflective area was formed by a "filling material" and hence relied on Komoto for the teaching of "forming curved surfaces (surface of 542E)" utilizing "filling compounds". Further, the rejection concludes by explaining why one of ordinary skill in the art would be motivated to providing a "curved surface" for reflecting as well as the motivation for forming the curved surface by "a filling material" or filling compound.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ajay K. Arora whose telephone number is (571) 272-8347. The examiner can normally be reached on Mon through Fri, 8am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sara W Crane

Sara Crane
Primary Examiner